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Master's Thesis Defense by Elizabeth Martinez | Biological Engineering

USU College of Engineering

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Designing a Clarifier to Recover Wastewater Algae Biomass for Production of Biofuels

December 9, 2015 at 10:30 in ENGR 402C.
Everyone is welcome to attend!

Abstract:
The Logan Lagoons, Logan City's Wastewater Treatment Facility ensures 15 million gallons of wastewater are cleaned and filtered each day. With the implementation of new and stricter wastewater effluent standards, the city of Logan now has to guarantee the phosphorous concentration in the effluent is also reduced. Algal biomass produced and harvested from the lagoons has been proven to affect the way nitrogen and phosphorous are removed while having the potential to be converted to biofuels. Therefore, implementing a secondary type clarifier in the Logan Lagoons would produce clean treated water with a reduced phosphorous concentration, and algae feedstock for biofuel production.
While several factors influence clarifier design, the settling characteristics of flocculent algae in wastewater were the main focus of this project. Sedimentation columns were used to calculate Surface Overflow Rate, detention time and algae percent removal. The addition of chemicals and zeta potential, to promote flocculation and higher algae percent removal, were also studied.
Preliminary results revealed a large fraction of the algae can be removed by means of sedimentation prior to chemical dosing. A suspended removal efficiency of 40%-60% with a detention time of 1.5-3 hours was attained and a surface overflow rate between 30-75 ft/day was calculated. Furthermore, a pH of 8-11 influenced a neutral Zeta potential, increasing algae percent and phosphorous removal even further.

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